REAPPEARANCE OF ENCKE'S COMET

IT is quite possible that before the close of the next period of absence of moonlight in the early evening hours, the comet of Encke may be again detected with the large telescopes now to be found in our observatories. The mean motion determined by Glasenapp for the last perihelion passage at the end of December 1871 would bring the comet to the same point of its orbit about 1875, April 11.5, which was very nearly the date of passage through perihelion in 1842. When it was last in aphelion, in the middle of August 1873, I find its distance from the planet Jupiter would be 10·02, and that from Saturn 7·3, so that the perturbations during the present revolution are likely to be small; the comet still approaches near the orbit of Mercury in heliocentric longitude 123·7° and latitude 6·8° N., but it has not encountered that planet since November 1848. Assuming, then, that the least distance from the sun will be attained at midnight on the 11th of April next, we have the following positions of the comet during the period I have named :—

AT 12H. GREENWICH TIME

1874-75.		R.A.			N.P.D.		Distance from Earth.	Distance from Sun.
		h.	m.	s.	°	′		
Dec. 22	...	22	50	31	88	19·9	1·945	1·919
„ 26	...	22	53	12	88	9·9	1·958	1·874
„ 30	...	22	56	18	87	57·2	1·968	1·828
Jan. 3	...	22	59	47	87	41·6	1·976	1·781
„ 7	...	23	3	38	87	23·2	1·981	1·733

An acceleration or retardation of four days in the time of perihelion passage will not change the geocentric place more than fifteen minutes of arc, so that if the comet be within reach it may be easily found.

It will be interesting to learn what account some of the large reflecting telescopes with which many amateurs in this country have provided themselves, can give of the comet at this return.

The computation of the perturbations and preparation of an accurate ephemeris for 1875 is understood to be in the hands of Dr. von Asten, of Pulkova; but I am not aware that the results have yet been given to astronomers.

J. R. HIND

Mr. Bishop's Observatory, Twickenham, Dec. 14

NOTES

SINCE our last week's note, we understand that the whaling steamer *Bloodhound*, of Greenock, has been purchased as the chief vessel of the new Arctic Expedition. Other whalers have been examined by Sir Leopold M'Clintock, but none have been deemed suitable. The *Bloodhound* is a screw steamer, whose engines are nominally 96 horse-power; she is barque-rigged, two years old, strong, sound, and well appointed, and handy either under steam or canvas. It is announced that the vessel chosen to be the consort of the steam-whaler *Bloodhound* in the forthcoming expedition is Her Majesty's ship *Alert*. She is a five-gun steam-sloop of 751 tons old measurement, and 100 horse-power nominal. The *Alert* has been docked at Portsmouth and will undergo a thorough survey. Active preparations for the equipment of the ships will soon commence, but the start will not be made until the latter part of June of next year, as it is considered merely waste of labour and time to push across the north water until the ice has had time to melt and drift out from Smith's Sound. A request has been made by the Foreign Office that the Danish Government will permit their agents at Disco, Proven, and Upernavik to collect hunters, dogs, and dog-drivers for the Arctic Expedition. Capt. Nares is expected to arrive in this country about the end of January, 1875. The Committee for making arrangements with respect to the Expedition sat on Tuesday and Wednesday at the Admiralty for the purpose of deciding on the provisions and clothing to be supplied to the members of the expedition. They have been occupied hitherto with details as to the route.

Apropos of the possible biological results of the Arctic Expedition, we may recall to recollection a few additional details to those given last week of what was accomplished by the *Polaris*. The northern limit actually reached was 82° 16′. Yet at this extreme latitude fifteen species of plants were collected, five of which were grasses. Twenty-six musk oxen were shot in lat. 81° 38′. Dr. Bessels also made a fair collection of insects, principally flies and beetles, two or three butterflies and mosquitos; and birds of seventeen different kinds were shot in 82°, including two Sabine gulls and an Iceland snipe.

DURING the whole of the past week the members of the French Academy of Sciences have had frequent meetings to receive the telegrams from the several French Transit stations. The first, from Janssen, relieved them of a great anxiety, and was published instantly. The most extraordinary measures have been taken to secure the safe transmission of the results of the observations at French stations. The chief of each station is ordered to make four copies of his observations. One is to be left under a cairn, or a tree (if any in the country), or in an excavation, the site to be described in a letter to the Institute; the second is to be handed over to the captain of the first French ship that is met, with instructions to bring it himself to the Institute; the third is to be delivered to the nearest French consul, agent, or ambassador; the fourth is to be kept by the chief of the station himself.

MM. FIZEAU and Cornu, authorised by M. Leverrier, have been making an experiment of the highest importance at the Paris Observatory, the results of which were to be given at Monday's sitting of the Academy. The two *savants* have been measuring the velocity of transmission of light, by experiments carried on between the Observatory and Montlhéry. The light sent to Montlhéry is reflected and returns to the Observatory, the distance there and back being 22,000 yards. The experiment has never hitherto been made on so grand a scale, nor with such precautions; ten powerful instruments were used.

HER MAJESTY'S ship *Basilisk*, which has just returned to England after a commission of nearly four years, has (the *Times* states) surveyed about 1,200 miles of coast line, added at least twelve first-class harbours, several navigable rivers, and more than one hundred islands, large and small, to the chart; and, lastly, has been able to announce the existence of a new and shorter route between Australia and China. Till these *Basilisk* discoveries were made, a large archipelago of islands (some as large as the Isle of Wight, and densely populated), a rich fertile country, intersected by navigable rivers, and inhabited by a semi-civilised Malay race, remained unknown to us. After the news of this ship's first discoveries reached England, Lieut. Dawson, R.N. (Admiralty Surveyor), was sent out to join her, and she was ordered to complete and follow them up. This has been done with perfect success, and the whole of the previously unknown shores of Eastern New Guinea have been carefully surveyed, and the route above referred to opened up. The principal part of this work of discovery and surveying has been performed by the captain and officers in small open boats, detached from the ship in some instances for many weeks, and among savages who had never before seen a white face. It is stated that two lofty mountains, about 11,000 feet high, facing each other on the north-east coast of New Guinea, have been named "Mount Gladstone" and "Mount Disraeli." This intelligence will have an interest of rather a tantalising kind for naturalists. There is hardly any part of the world more promising to students of the geographical distribution of living forms than that which the *Basilisk* has surveyed. Collections, more especially of the plants, might doubtless often have been made.

and would have been of the highest possible value. It is much to be wished that with the existence of such opportunities as these some one might be found to put in a word in aid of purely scientific claims. Doubtless it is pleasant to think that the two rival mountains will be a perpetual memory of frowns frowned elsewhere, but how much more pleasant to know something of the things that grow and live upon them.

The *Irish Times* states that one of the objects of Sir Stafford Northcote's visit to Ireland is to "examine the sites proposed for the establishment in Dublin of an extensive National Museum of Science and Art, analogous in principle, although not in extent, to that at Kensington."

After the Franco-Prussian war of 1870-71, it is well known that in many districts in France a new vegetation sprang up, evidently the result of the invasion. It was believed that this vegetation would become acclimatised. It is not so, however, *L'Institut* informs us; at least very few of the species introduced in this way appear likely to continue to flourish on French soil. In the departments of Loiret and Loir-et-Cher, of 163 German species, the half at least have already disappeared, and the surviving species diminish in vigour each year. Scarcely five or six species would appear to manifest any tendency to become acclimatised; these are, according to M. Nouel, *Alyssum incanum, Trifolium resupinatum, Rapistrum rugosum, Melilotus sulcata,* and *Vulpia ligustica.* On the plateau of Bellevue, where in 1871 many strange species were seen, M. Bureau has been able to find only one—*Trifolium resupinatum.* M. Gaudefroy also, who in 1871 and 1872 found many adventitious plants, has been able to collect only two this year—*Ranunculus macrophyllus* and *Linum angustifolium.*

The Transactions and Proceedings of the New Zealand Institute always contain a collection of papers of high scientific value, and vol. vi. issued last June is no exception to this rule. It is a bulky volume of some 454 pages, added to which is an appendix of 104 pages more. It may not be known to many of our readers that the New Zealand Institute is composed of the following incorporated societies, each of which includes amongst its office-bearers and members one or more names eminent in science in the colony and well known in this country. The individual societies are, the Wellington Philosophical Society, Auckland Institute, Philosophical Institute of Canterbury, Otago Institute, and the Nelson Association for the Promotion of Science and Industry. On the council of these various societies occur such names as Dr. Hector, F.R.S., Dr. Haast, F.R.S., Mr. W. T. L. Travers, F.L.S., Mr. T. Kirk, F.L.S., &c. Each one of the societies numbers amongst its members the scientific men of its neighbourhood, and amongst the honorary members of the incorporated Institute are such names as Charles Darwin, Prof. Huxley, Dr. Hooker, Sir Charles Lyell, Prof. Owen, Prof. W. H. Flower, &c. These facts are sufficient to show that New Zealand is particularly fortunate in having amongst its residents men eminent in various branches of science. No colony has shown more aptitude for scientific work than New Zealand, and perhaps no other colony can boast of a society approaching so near to our Royal Society, both as regards the value of the papers contributed and the range of scientific investigation. Zoology, Botany, Chemistry, and Geology are all represented by numerous papers in each section. In the first, Dr. Haast contributes an illustrated article "On *Harpagornis*, an extinct genus of gigantic raptorial birds of New Zealand;" while Dr. J. E. Gray, who is an hon. member of the Institute, supplies a "List of Seals, Whales, and Dolphins of New Zealand," and Capt. F. W. Hutton some "Notes on some New Zealand Fishes." In Botany we find a "List of the Algæ of the Chatham Islands, collected by H. H. Travers, and examined by Prof. John Agardh, of Lund"; "Notes on the Flora of the Province of Wellington, with a list of plants collected therein," by John Buchanan; and by Mr. W. T. L. Travers a few notes "On the spread of *Cassine leptophylla.*" In Chemistry, Mr. W. Skey talks about the Mineral Oils of New Zealand; and in Geology are papers "On the Formation of Mountains," by Capt. Hutton; "On the Extinct Glaciers of the Middle Island of New Zealand," by W. T. L. Travers; "On the Fossil Reptilia of New Zealand," by Dr. Hector; besides other interesting papers.

The Cambridge Natural Science Club has held eight meetings this term on Saturday evenings, and some good papers have been read by the members at the meetings in their rooms, usually followed by a discussion. The attendance has mostly been under the average of other terms, on account of some of the members being candidates in the Natural Science Tripos now being held. The following are some of this term's papers:—"The Reniportal Circulation," by Mr. P. H. Carpenter (Trin. Coll.); "Vegetation as affecting Climate," by Mr. J. M. F. H. Stone (St. Peter's Coll.); "Tides," by Mr. Arthur Buxton, B.A. (Trin. Coll.); "Comparisons of Nervous Systems of Vertebrata and Invertebrata," by Mr. T. W. Bridge (Trin. Coll.); "The Influence of Molecular Structure upon some Organic Bodies," by Mr. E. B. Sargant (Trin. Coll.); "The Theory of the Identity of Matter," by Mr. P. R. Ogle (St. Peter's Coll.); "The Development of Blood," by Mr. S. H. Vines (Christ's Coll.)

It is gratifying to see a growing tendency in the not professedly scientific press to endeavour to account for the causes of phenomena which it is called upon to notice; thus, consciously or unconsciously, treating occurrences in a scientific spirit. For example, *The Country*, in speaking of the migration of birds, states that woodcocks have been unusually scarce in Cornwall for the past two or three years, nor is the present season an exception to the rule, for, notwithstanding favourable winds and moonlight nights, they continue *raræ aves* in the county. In attempting to account for this, *The Country* very pertinently suggests that improved agriculture has more or less destroyed the feeding grounds, though, as the same may be said of other parts of the kingdom where such game is not scarce, this cannot be the only cause.

A telegram to Cairo, dated the 8th inst., from the Governor-General of the Soudan, announces that the entire kingdom of Darfour has accepted annexation to Egypt.

The American Society of Paris proposes to hold an "International Congress of Americanists" at Nancy, near Paris, on the 22nd of July, 1875, the object being to bring together those who are interested in the history of America prior to its discovery by Columbus, and in the interpretation of the monuments and of the ethnology of the native races of the New World. An exhibition of American Archæology is to be held at the same time. Any American can be enrolled as a member of the Congress by forwarding the sum of twelve francs to Mr. Lucien Adam, secretary of the American Society of Arts, Rue Bonaparte, in Paris.

A series of experiments has lately been made by the Russian Government with reference to the use of electricity for the headlight of locomotives, a battery of forty-eight elements making everything distinct on the railway track to a distance of over 1,300 ft.

A curious phenomenon frequently met with in the Indian Ocean, the real cause of which has not yet been ascertained, is the existence off Malabar, and in certain spots along the Coromandel coast, of vast mud banks, and of tracts of mud suspended in the sea, wherein many kinds of fish find abundance of food, immunity from much disturbance in the surrounding element, and a locality in which to breed. The exact cause of the existence of these large tracts of sea wherein mud remains in solution is still a mystery, but at any rate the ocean is so smooth that, even during the height of the south-west monsoon, vessels can run for shelter into their midst, and once there are as safe as when inside a breakwater. If the surface is so still, of course so is the water below, and such spots seem to be well suited to the siluroid fishes. These curious patches of sea which appear in a continually perturbed state, and the sea-bottom in the locality, would probably well repay careful scientific observation.

The manufacture of isinglass, generally supposed to be confined to Russia and North America, or other countries where the sturgeon is found in abundance, is carried on to a considerable extent in India, principally from the air-vessels of several varieties of acanthopterygian fishes, and particularly, different kinds of perch, as well as from other fish. There is room for a great extension of the trade, as isinglass, the purest known form of animal jelly, has, in a measure, had its consumption checked by its high price, and substitutes are employed, such as gelatine, of which it is itself the purest form.

At the last meeting of the British Association a committee was appointed to investigate the circulation of the underground water in the New Red Sandstone and Permian Formations of England, and the quantity and character of the water supplied to the various towns and districts from these formations. Prof. Hull, M.A., F.R.S., director of the Geological Survey of Ireland, is chairman, and Mr. C. E. de Rance, F.G.S., Scientific Club, 7, Saville Row, London, W., secretary. The following queries have been circulated by the committee for the purpose of eliciting information in connection with the important subject:—1. *Position* of well, or wells, with which you are acquainted. 2. Approximate *height* of the same above the mean sea level. 3. *Depth* from surface to bottom of shaft of well, with diameter. *Depth* from surface to bottom of bore-hole, with diameter. 4. Height at which water stands *before* and *after* pumping. Number of hours elapsing before ordinary level is restored, after pumping. 5. *Quantity* capable of being pumped in gallons per day. 6. Does the *water level* vary at different seasons of the year, and how? Has it diminished during the last ten years? 7. Is the ordinary *water level* ever affected by local rains, and if so, in how short a time? And how does it stand in regard to the level of the water in the neighbouring streams, or sea? 8. *Analysis* of the water, if any? Does the water possess any marked *peculiarity?* 9. Nature of the rock passed through, including cover of drift, with *thicknesses*. 10. Does the cover of drift over the rock contain *surface springs*. 11. If so, are they entirely kept *out* of the well? 12. Are any large *faults* known to exist close to the well? 13. Were any *salt springs* or brine wells passed through in making the well? 14. Are there any *salt springs* in the neighbourhood? 15. Have any wells or borings been discontinued in your neighbourhood, in consequence of the water being more or less *brackish?* If so, if possible, please give section in reply to query No. 9.

We have received, among the results of the geographical and geological explorations of the Western (U.S.) States, the annotated list of the birds of Utah, by Mr. H. W. Henshaw, containing the names of 214 species, of which 160 were either taken or noted in the expedition. The author thinks that if collections were, as they have not yet been, made during the spring months, several extra species would have to be added to the collection.

Coal is beginning to attract attention in New South Wales, in some parts of which the mineral is being found in abundance, and the pre-eminence which gold and copper have maintained will be assailed by the increasing importance of the newly worked product. A seam, seven feet thick, has been opened at Broughton Creek, near the Shoalhaven River, and not far from the Moss Vale Railway Station; so that every circumstance of locality is in favour of its profitable working.

The *American Chemist* for August and September, which we have just received, contains a full account of the proceedings at the Priestley Centenary in Northumberland, Pa., on July 31 last. There was then a large and enthusiastic gathering of men of science and others, and several valuable addresses were given. The principal one in the numbers before us is by Prof. B. Silliman, being a long, minutely detailed, and carefully compiled paper on "American Contributions to Chemistry."

We are gratified to see that the *Geographical Magazine* has been so successful that the price is to be reduced to one shilling.

The additions to the Zoological Society's Gardens during the past week include a Chamois (*Rupicapra tragus*) from the Pyrenees, presented by Mr. A. Wilson; a White-fronted Capuchin (*Cebus albifrons*) from South America, presented by Mrs. Carpenter; a common Boa (*Boa constrictor*) from South America, presented by Capt. E. C. Kemp; two Barred-tailed Pheasants (*Phasianus reevesii*) from North China, received in exchange.

ON THE STRUCTURE OF STIGMARIA *

At a meeting of the Manchester Literary and Philosophical Society, held on October 20, Mr. Binney called in question some conclusions at which I had arrived and had published in Part II. of my memoirs on the Structure of the Coal Plants, respecting the organisation of Stigmaria. Mr. Binney further published an abstract of his remarks in Part II. of vol. xiv. of the Society's Proceedings. Believing that Mr. Binney's observations, if allowed to pass unnoticed, may mislead some palæontologists unacquainted with Stigmaria, I feel called upon to reply to them through the same channel as that which he has employed for their promulgation. The general features of the plant known for half a century as *Stigmaria ficoides* have been so well described by Lindley and Hutton, Dr. Hooker, Mr. Binney, and Brongniart, that no one familiar with those descriptions can fail to recognise it without difficulty. That plant consisted of a central medulla, surrounded by a cylinder of scalariform vessels arranged in radiating wedges, very distinctly separated by two kinds of medullary rays (primary and secondary), the whole being enclosed in a thick bark, from the surface of which spring numerous large cylindrical rootlets. The vascular cylinder gives off numerous large vascular bundles of scalariform vessels, which proceed outwards, through the conspicuous primary medullary rays, to reach the rootlets.

The dispute between Mr. Binney and myself resolves itself chiefly into three points: (1), the structure of the medulla of Stigmaria; (2), the source whence the vascular bundles supplying them are derived; and (3), the nature of some vascular bundles which both Mr. Binney and M. Goeppert have figured as existing within the medulla, and one of which is prolonged radially in M. Goeppert's example through a medullary ray. Mr. Binney and M. Goeppert believe that the cellular medulla of Stigmaria contained bundles of very large scalariform vessels, and that those bundles proceeded outwards to supply the rootlets. On the other hand, in my second memoir, referred to by Mr. Binney, I not only expressed my conviction, but demonstrated the absolute certainty, that such was not their origin. I adhere to the same opinion as I previously expressed, and have the specimens on the table which prove its correctness. The fact that these bundles were derived not from the medulla, but from the vascular wedges of the woody cylinder, was illustrated by the figures 43, 44, and 47 of the memoir referred to, figures which accurately represent, not conditions occasionally met with, but those which characterise every specimen of the true *Stigmaria ficoides*. In the memoir I further affirm that immediately within the woody cylinder there exists a delicate cellular tissue, and state that one of my specimens makes it perfectly clear that the entire medulla consisted of similar cells, unmixed with any vascular bundles whatever such as were represented in M. Goeppert's and Mr. Binney's figures, and the accuracy of which is, was, and it appears still is, endorsed by Mr. Binney. After thus endorsing what I believe to be a grave mistake, Mr. Binney proceeds to justify his doing so by appealing to a specimen which I have not seen, but which Mr. Binney's own description convinces me is a plant altogether different alike from the Stigmaria of authors, and from M.

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* A paper read before the Manchester Philosophical Society, by Prof. W. C. Williamson, F.R.S., Nov. 17.